REMARKS

Applicants have amended the claims to better define the invention. Applicants affirm the election to Group I claims. Applicants have canceled claims 13-16, but left claim 3 withdrawn. Applicants submit that the amendments to claim 1 have made it allowable, thus claim 3 should also be allowed. The amendments to claim 1 overcome the rejection of claims 10 and 11 under 35 USC 112. Applicants respectfully traverse the rejection of the claims over the cited art and respectfully request reconsideration.

Claim 1 as amended requires that a first one of the peel plies be of a woven material and be in contact with the bonding surface. This peel ply in the specification is indicated by the numeral 19 in Figures 1 and 2 and the numeral 33 in Figure 3. An advantage of using a woven peel ply is that during curing it provides a textured bonding surface 15 to panel 11. Later, when the peel plies are removed to expose the stubble of the Z-pins 13, the textured bonding surface is exposed. The textured surface facilitates bonding of the base 49 of uncured perform 47 to cured component 11.

In Childress, peel ply 14, shown in Figure 1, is formed of Teflon. A Teflon peel ply is not woven and does not form a textured surface while panel 10 is being cured. Applicants submit that this is an important difference from Childress. Childress mentions the Teflon peel ply 14 at column 13, line 8 and does not suggest any other types of peel plies.

The other references also do not suggest a woven peel ply applied to a bonding surface through which Z-pins are inserted. Owens does not mention Z-pins or peel plies, whether woven or not. Bersuch mentions Z-fibers, but makes no mention of peel plies.

Leach discloses covering a fabric 10 with a peel ply that could comprise a woven nylon typewriter ribbon or glass or Teflon treated glass "which gives a smooth surface to the part when it is removed." (Column 4, line 64). This surface on which the peel ply is applied is the exterior surface of the component 30, not a bonding surface to which another component is adhered. Furthermore, the peel ply is removed before curing of the product, which occurs in stage 47 and is explained at column 5, lines 13-16 of Leach.

Applicants submit that it would not be obvious to utilize a woven peel ply in Childress in view of Leach because Leach teaches a peel ply merely to provide a smooth exterior surface. The peel ply in Childress, on the other hand, is utilized to provide a desired height for the stubble of the pins. Applicants submit that Childress suggests the use of Teflon so as to facilitate the removal of the peel ply. Childress does not appreciate the advantages of a textured surface created by a woven peel ply. Once skilled in the art would not look to Leach for providing an answer to better bonding between a first and a second component.

Additionally, even if Leach is combined with Childress, Leach teaches to remove the woven peel ply before curing. Childress teaches to leave peel ply 14 on to protect the Z-pin stubble during storage after curing, as explained at column 16, lines 8-10. The processes of Leach and Childress are thus incompatible because Leach teaches to remove the woven preform before curing while Childress teaches to keep the Teflon layer in place after curing of the panel to protect the stubble until final assembly.

Claims 2 and 3 depend from claim 1, thus should be allowed. Claim 24 depends from claim 1 and requires placing a foam carrier containing the pins against the peel plies, exerting a downward force on the foam carrier, then removing the foam carrier prior to curing the

component. Childress teaches away from this requirement by specifying that the foam carrier remain in place until final assembly. Also, in one method, Childress requires the foam carrier to be in place within the vacuum bag to cause insertion of the Z-pins during the curing process.

Claim 25 depends from claim 24, requiring leveling the pins to cause the ends of the pins to be flush with an exterior surface of the peel plies. Childress, on the other hand, teaches nothing about making the ends of the pins flush. Even if it were obvious for one to make the ends flush in view of Childress, the teaching from Childress would be to make them flush with the exterior surface of the foam carrier, not the peel plies.

Claim 26 is similar to claim 25 but it requires removing at least one of the peel plies and shearing protruding ends of the pins to be flush with the exterior surface. This is not suggested in Childress, rather Childress teaches to retain the foam carrier.

Claim 4, like claim 1, requires that the layer in contact with the bonding surface be a woven peel ply layer. Claim 4 also requires that the Z-pins be located initially within a foam carrier. Claim 4 requires leveling the Z-pins to cause ends of the Z-pins to be flush with an exterior surface of the stack of layers with the foam carrier removed. The specification explains two methods for leveling the Z-pins at the bottom paragraph of page 8 and top paragraph of page 9. For graphite pins, preferably the ends are sheared off after the curing step. For titanium pins, after removal of the foam carrier, the vibrating head is used to drive the pins further downward before curing until their ends are flush with the upper surface of the stack of layers.

The references do not disclose a step of removing a foam carrier for the Z-pins and causing the ends of the Z-pins to be flush with an exterior surface of a stack of layers. On page 6 of the office action, the examiner stated that it would be obvious to one of ordinary skill in the art

at the time the invention was made to remove a peel ply and trim the pins even with the ply surface so as to insure the pins were all of the same height. Applicants respectfully disagree. There is no suggestion in the references that it is feasible to level the pins. The pins would function whether or not their ends were all exposed at the same height. Applicants submit that better results are obtained when all of the ends are flush with the peel ply exterior, and the references do not suggest this step.

Furthermore, Applicants submit that Childress teaches away from making the ends flush with the upper surface of a peel ply layer because Childress teaches to retain the foam carrier layer until final assembly. As explained at column 16, lines 9 and 10, the crushed foam 650 and release ply 600 protect the stubble until assembly of the detailed parts. In order for the crushed foam carrier to remain in place, it appears that the pins must extend into the foam carrier to retain it. If the ends were flush with the peel ply layer below the foam carrier, then there's no mention of what would hold the foam carrier on the peel ply. To remove the foam carrier, as required by claim 4, and make the ends flush with the peel plies would be opposite from the teachings of Childress. If it is obvious to trim the ends of the pins, as contended by the Examiner, Applicants submit that one viewing Childress would trim the ends of the pins to be flush with the top of the crushed foam carrier, not flush with the release ply as claimed.

Claims 5 and 6 depend from claim 4, thus should also be allowed. Claim 7 requires that the foam carrier be removed before curing of the panel. Childress teaches the opposite, to leave the foam carrier in place during curing. In fact, the method that Childress teaches for inserting the Z-pins requires the foam carrier to be located in a vacuum bag during the curing step, because it is the pressure of the vacuum bag that causes the pins to move into the component during the curing cycle. Consequently, one would not remove the foam carrier before curing as

required in claim 7, without destroying the teachings of Childress. Although Childress mentions the use of an ultrasonic head to insert the Z-pins as an alternative, Childress does not suggest removing the foam carrier before curing, even with this embodiment.

Claim 8 depends from claim 4, requiring after curing the panel, removing at least one of the layers and trimming the stubble to a height equal to a height of the stack of layers that remain on the bonding surface. As mentioned above, Applicants submit that Childress does not suggest trimming the pins. Moreover, if Childress did suggest trimming the pins, the concept would be to trim them flush with the top of the crushed foam layer, not to remove one of the peel layers and trim to a height of the remaining layers. Childress teaches to utilize the foam cushion layer as protection until final assembly.

Claim 9 deals with the alternate method of causing the ends of the Z-pins to be flush, and requires removing one of the layers to expose the ends of the Z-pins and exerting an additional force on the ends of the Z-pins until the ends are flush with the exterior surface of the remaining layers. For the reasons discussed above, Applicants submit that Childress does not suggest removing any of the layers. Childress teaches to retain the cushion layer for protection.

Claim 10 requires the peel ply be formed of nylon fibers, and claim 11 requires that the peel ply be formed of glass fibers. Childress, on the other hand, teaches Teflon for peel ply. As explained above, it would not be obvious to utilize a peel ply formed of woven nylon or glass fibers in view of Leach. Leach teaches a peel ply only for covering the exterior to provide a smooth surface, not to cover a bonding surface. Moreover, Leach teaches to remove the peel ply before curing.

Claim 12 requires that the stack of layers comprise an elastomeric spacer located above the first layer. Spacer 37, shown in Figure 3, avoids a need for having a plurality of woven peel plies in the Figure 3 embodiment. Childress teaches a Teflon layer, not an elastomeric spacer located above a woven peel ply. Applicants submit that this claim should be allowed.

Claim 17, similar to the other independent claims, requires a woven peel ply layer in contact with a bonding surface. It also requires, like claim 4, that the Z-pins be carried within a foam carrier for installation, the foam carrier being removed before curing of the panel. Childress teaches away from this requirement by requiring that the foam carrier remain as a protective element.

Claim 18 depends from claim 17, requiring after applying the peel ply and before insertion of the Z-pins, heating the panel and the peel ply to debulk the panel and the peel ply. This is not suggested in Childress.

Claim 19 requires shearing ends of the Z-pins flush with an exterior surface of the peel ply. As discussed above, this is not shown in the references. Claim 20 requires placing a non-porous film between woven peel plies. This film is shown by the numeral 13 in Figure 1, and preferably is Teflon. Childress does not suggest any use of woven peel plies. Neither Childress nor any of the references suggest multiple peel plies with a non-porous film between them. The film facilitates removing of the peel plies before final assembly and is an important part of the invention. Applicants submit that this claim should be allowed.

Claim 21 requires an elastomeric spacer on the peel ply, and this is not shown. It requires removing at least one additional layer on the peel ply along with the foam carrier. It requires leveling the Z-pins to cause the ends of the Z-pins to be flush with the remaining layers on the

bonding surface of the panel. As mentioned above, Applicants contend that it is not obvious to level the Z-pins, and even it if were, one skilled in the art reading Childress would level the Z-pins to be flush with the exterior surface of the foam carrier, not the remaining layers on the bonding surface of the panel. Claim 23 requires shearing the ends of the Z-pins after the panel is cured to make them flush with the remaining layers.

It is respectfully submitted that the claims are now in condition for allowance and favorable action is respectfully requested.

Respectfully submitted,

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